DETAILED ACTION

Response to Arguments

1. Applicant's arguments, with respect to §112, have been fully considered and are persuasive. The §112, 2nd paragraph rejection of claims 1, 2, 4-6 has been withdrawn.

2. Applicant's arguments with respect to claim 1 have been considered but are not persuasive.

Applicant's argument: Hui discloses a receiver device 404 with a weighting circuit 405... coupled to a selector 415 that is able to select a whitening filter h(n) for the channel coefficients c(k) stored in an auto-correlation memory on the basis of one of a set of candidate auto-correlations. Thus in contrast to the features of present claim 1, the candidate auto-correlations are stored in the auto correlation memory rather than externally set as recited in claim 1.

Examiner's response: In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "externally set") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant's argument: To more particularly emphasize this source of the expected spurious signal energy, claim 1 has been further amended as indicated above to replace the feature of the expected spurious signal energy being "set externally" with the feature of the expected spurious signal energy being "applied via a setting input" ... In this way, it is

emphasized that the expected spurious signal energy is input rather than being pre-determined and stored within the system.

Examiner's response: Applicant's amendment to the claims does not emphasize that the expected spurious signal energy is input rather than being pre-determined and stored within the system. Furthermore, this amendment does not exclude the application of art in which the expected spurious signal energy (auto-correlations) are pre-determined and stored within the system.

As such, Hui properly discloses the expected spurious signal energy (candidate auto-correlation) from the auto-correlation memory 420, is input into channel estimator 415, via a "setting input" (coefficient estimation circuits 422).

Applicant's argument: Since the only connection of the auto-correlation memory of Hui is internal to the receiver device, it is respectfully submitted that one having ordinary skill in the art would not understand Hui as teaching that the selector should select one of the weighting coefficient sets stored in the memory on the basis of an externally set expected spurious signal energy in the received signal, in particular an expected spurious signal energy that is applied via a setting input.

Examiner's response: The previous claim language for "set externally" is vague, since it did not specify a reference point to establish what is considered "internal" or "external". Examiner is entitled to the broadest, reasonable interpretation. As applied previously, Examiner interprets the candidate auto-correlation from auto-correlation memory 420 to be "external" to

the channel estimation block 415, and as such, Hui properly disclosed the limitation: "the expected spurious signal energy (candidate auto-correlation) is set externally."

Similarly, with respect to claim 1 as currently amended, Hui properly discloses the expected spurious signal energy (candidate auto-correlation from the auto-correlation memory 420), is input into channel estimator 415, via a "setting input" (coefficient estimation circuits 422).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vandenameele-Lepla (US 2003/0128751 - hereinafter Lepla) in view of Hui et al. (US 6,674,820, hereinafter "Hui"), and Dupree (US 5,175,558).

Regarding claim 1, Lepla discloses a weighting circuit for a receiver which is provided for receiving a multicarrier signal comprising carrier signals (carrier-specific weighting factors of a multi-carrier signal in a receiver, page 2, [0013]), comprising:

a memory storing a plurality of weighting coefficient sets (weight source 310, pages 5-6, [0050]),

a selector selecting one of the plurality of weighting coefficient sets stored in the memory (page 6, [0050], selecting weight values).

wherein the weighting circuit weights the carrier signals such that the spurious signal energy is of equal magnitude for all weighted carrier signals (value of each carrier-specific weighting factor is inversely proportional to a noise power associated with the carrier, page 3, [0021]; weights are the inverse of the noise power for a carrier page 6, [0051], [0052]; thus, if the weights are the inverse of the noise power, then the noise after application of the weights to each carrier would be 1, i.e. [x * (1/x) = 1]),

However, Lepla fails to expressly disclose:

(i) the selector selecting on the basis of an expected spurious signal energy in the received signal,

(ii) wherein said expected spurious signal energy is set applied via a setting input; and

(iii) wherein the memory is programmable via an interface connected to said memory through a plurality of data lines, and

(iv) wherein the programmable memory is connected to the selector via a plurality of address lines,

(v) the selector being capable of selecting a particular weighting coefficient set from the plurality of weighting coefficient sets stored within the memory.

Nevertheless, Lepla discloses the values of the carrier-dependent weights are controlled to account for the effect of frequency-dependent (non-white) noise in the system (page 6, [0050]; non-white = frequency dependent, page 2, [0013]), and the noise power spectrum is measured off-chip and values for the carrier dependent weights programmed into weight source 310 (page 6, [0051], Fig. 3).

With respect to items (i), (ii), and (v), Hui et al. discloses systems for receiving signals subject to colored noise (title, Fig. 4). Hui et al. discloses systems for estimating the color of the baseband noise by selection of the best result among a plurality of candidate noise color assumptions (col. 3, lines 37-41). The color characteristic of the colored noise may be an auto-correlation of the colored noise (col. 3, lines 55-60). Whitening filters are determined in advance for each candidate auto-correlation value and saved in memory, and the predetermined whitening filter is selected at block 515 (col. 10, lines 4-7). Thus, each candidate auto-correlation values (expected spurious signal energy - treated as an "address"), is associated with different whitening filters stored in memory (weights - treated as "memory contents"). Therefore, the programmable memory is connected to the selector which selects a specific whitening filter ("set of weighting coefficients") according to a specified candidate auto-correlation ("address") from the memory.

Hui further discloses auto-correlation memory 420 for storing candidate auto-correlation values corresponding to disturbances v(n) (col. 9, lines 40-67, Figs. 4 and 5; see also col. 2, lines 15-40 for auto-correlation of disturbance v(n); equation 2). Thus, the auto-correlation memory 420 sets the expected/candidate auto-correlation values external to the channel estimator 415, via an input in the coefficient estimation blocks 422 (Fig. 4).

Because both Lepla and Hui disclose receiving apparatus and methods for accounting for colored (non-white noise) by selecting a set of weighting factors/filter (coefficients), it would have been obvious to one of ordinary skill in the art to substitute one teaching for the other, for the predictable result of storing different sets of factors/filter (coefficients) in memory and selecting one based on the color characteristic of the non-white/colored noise, and setting the candidate auto-correlation values external from the channel estimator.

With respect to item (iii), Lepla discloses a noise power spectrum measured off-chip and values for the carrier dependent weights programmed into weight source 310, page 6, [0051], Fig. 3).

Dupree discloses weight memory 66, connected to sequential update 56, internal to system 24 (Fig. 2).

Because both Lepla and Dupree discloses updating/programming weight memory/storage, it would have been obvious to one of ordinary skill in the art to substitute one weight memory update scheme for the other, for the predictable result of a memory updated via internal data lines.

With respect to item (iv), Lepla, Hui, and Dupree disclose everything above, but do not explicitly disclose that there are a plurality of address lines between the programmable memory and the selector.

This would have been an obvious matter of design choice, since applicant has not disclosed that the use of a plurality of address lines as opposed to a single implied address line (candidate auto-correlation) solves a particular problem or is for some special purpose, and it appears that the memory access for the system would perform equally well with either one or a plurality of address lines.

Regarding claim 2, Hui further discloses the weighting circuit has at least one multiplier which multiplies an associated carrier signal by a stored weighting coefficient from the selected weighting coefficient set (FIR whitening filter multiplies filter coefficients {h(k)} and signal r(n), col. 9, lines 3-10).

Regarding claims 4 and 5, Lepla discloses everything applied to claim 3, and further discloses the multicarrier signal is broken down into carrier signals by a computation circuit that is a Fast Fourier Transformation circuit (FFT 126, Fig. 1).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vandenameele-Lepla in view of Hui and Dupree as applied to claim 5 above, and further in view of Nasserbakht (US 6,122,703).

Regarding claim 6, Lepla, and Hui disclose everything applied to claim 5, but fail to expressly disclose the carrier signal broken down by the computation circuit are buffer-stored in a buffer store.

However, FFT output buffers are well known in the art, as evidenced by Nasserbakht (FFT output buffer 326, col. 10, lines 49-56, Fig. 3).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to provide an output buffer for storing the output of the FFT circuit, since FFT output buffers are well known in the art.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Okanoue et al. (US 6,643,339)

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID HUANG whose telephone number is (571)270-1798. The examiner can normally be reached on Monday - Friday, 8:00 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on (571) 272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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